SPECIAL PROJECT PROGRESS REPORT

All the following mandatory information needs to be provided. The length should *reflect the complexity and duration* of the project.

Reporting year	2025
Project Title:	ACCORD common codes maintenance Special Project
Computer Project Account:	**SPFRACCO**
Principal Investigator(s):	Claude FISCHER
Affiliation:	Météo-France
Name of ECMWF scientist(s) collaborating to the project (if applicable)	---
Start date of the project:	1/1/2022
Expected end date:	31/12/2027

Computer resources allocated/used for the current year and the previous one

(if applicable)
Please answer for all project resources

		Previous year		Current year	
		Allocated	Used	Allocated	Used
High Performance Computing Facility	(units)	20 MSBU	4 MSBU	20 MSBU	1.2 MSBU
Data storage capacity	(Gbytes)	10.000		15.000	

Summary of project objectives (10 lines max)

The goal of this SP is to provide resources to the ACCORD consortium in order to (1) enhance its capability on a common maintenance of the shared NWP codes, (2) further develop and ensure the portability of the tools used for this maintenance and (3) increase the level of validation of common code versions. Hereafter are the major elements of context for this SP request, and the description of the planned activity.

These efforts fall under the strategic goal in ACCORD to maintain and strengthen a common working environment and common working practices. With respect to the previous phase of this SP (2022-2024), the scope is slightly increased to take into account elements from the ACCORD draft scientific strategy 2026-2030 (https://www.accord-nwp.org/?Strategy-2026-2030).

Summary of problems encountered (10 lines max)

Summary of plans for the continuation of the project (10 lines max)

We will continue to use the special project resources for installing new ACCORD code versions on the ECMWF HPC, along with testing and validation tools. The goal is to be able to now install any new code release in both the ECMWF and the Meteo-France computers (see list below from CY50 to CY51). As a new goal from 2025 on, we will create an infrastructure facilitating process-oriented verification, or comparison of model results to references provided by research networks such as Cloudnet or Earth observation missions, and LES.
We plan to apply our facility also to assessing the value of high-resolution in forecasting high-impact weather, and for comparing physics-based and data driven forecasts w.r.t physical processes and the evolution of weather systems.

List of publications/reports from the project with complete references

The most appropriate current references are the talks about the new ACCORD working practices on the common codes, given at the All Staff Workshop in April this year:

- SANTOS Daniel: ACCORD System activities 2020-2024 review
- MARY Alexandre: Of source code management
- FORTELIUS Carl: **MQA infrastructure** (specific material related to an upcoming ACCORD Working Week available on demand from the ACCORD wiki pages)
- FISCHER Claude: ACCORD introductory presentation

Summary of results

Code integration procedures and recent code versions for ACCORD.

From an integrated unique repo to an ecosystem (See Figure 1):
• Recent years/cycles have seen “externalisation” of sub-projects from IAL : fiat, ectrans, oops...
• others are on their way : FA, PHYEX, SURFEX
• Need for specialized integrators for certain projects, in close coordination with the ACCORD Integration Leader and the Area Leaders
• Clarification of the workflow (branches/forks, tools...)
• Interfaces breaks : particular attention and coordination is required

Figure 1: Ecosystem of repos and bundling towards a single complete executable binary file

Recent code versions: overview about the build of CY50T1
• Contribution window is closed since February 2025
• 100+ contributions of various size
• Never too late for reviews - code reviews are essential and need to be further promoted (if not made mandatory)
• Declaration of CY50T1 by May-June

Next planned common ACCORD code version: CY50T2
• Technical cycle, mostly : externalisations (FA, SURFEX, PHYEX)
• Expected by the end of summer 2025

SURFEX
• New contributions will then have to be done on its new official repo (basis to be confirmed)
• Version of 49T1 has been merged with V9 (Patrick Samuelsson, Adrien Napoly)
• Validation of 49T1+V9 for integration in V9.2 : ongoing
• Validation of V9+ in NWP context : ongoing

CY51
• CY50R1 + CY50T1/T2
• Merge dates tbc with ECMWF
• Post-merge Working Week in Toulouse for phasing and validation (Q4/2025)

and beyond ? => Continuous Integration within ACCORD, in parallel to common cycles with ECMWF => 2 recent proposals have emerged :

1. CI within ACCORD, in parallel to common cycles with ECMWF (see Figure 2)

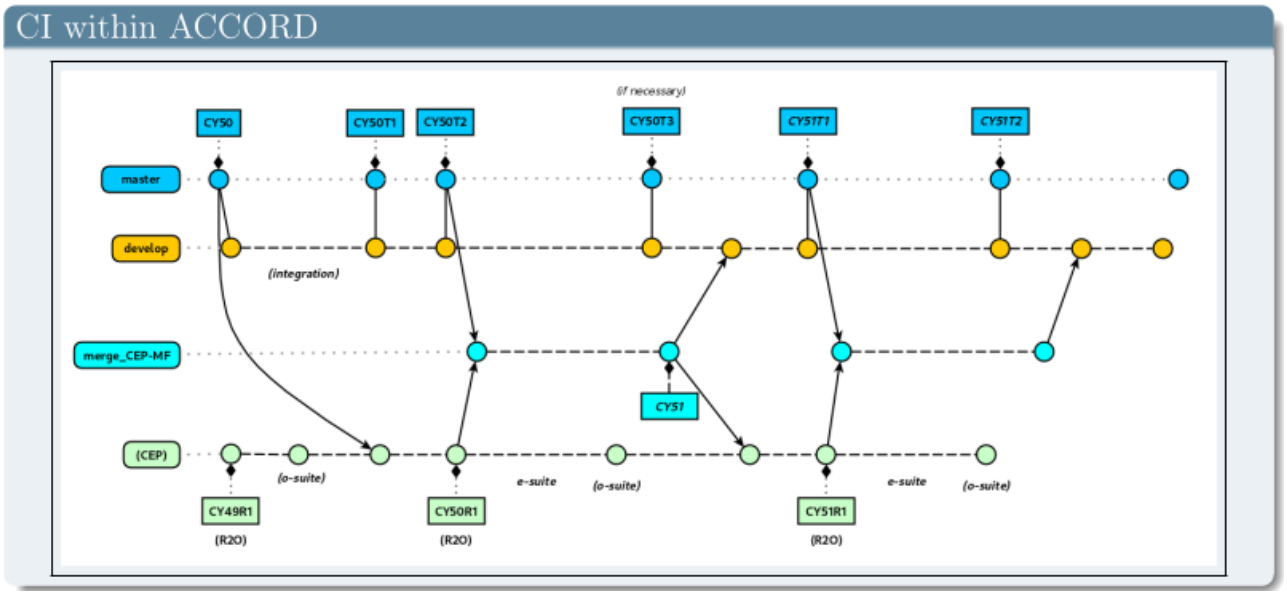

Figure 2: Schematic of code versions and continuous integration in a "develop branch"

2. CI in common with ECMWF for bit-identical or technical (neutral) changes only => under investigation

• requires comprehensive & automatised testing
• in parallel : R/T cycles for meteorological impact
• common cycles : merge of R/T + update of CI branch and tests
• on a dedicated github fork and branch

System activities in ACCORD.

In 2024-2025, a variety of actions have been undertaken based on ACCORD direct support.

Transfer of knowledge and collaborative development actions:
GIT :
- GitHub for ACCORD forge: Git Forge webinar
- local support to implement GIT working practices: technical visits at ACCORD Member's premises
DAVAÏ:
- Development and implementation working weeks: DAVAÏ contributors-developers Working Weeks once every year (2022-2023-2024, also planned in 2025)
- Users training: DAVAÏ training as a webinar
- Training on ECMWF's HPCF for Davaï testers and code integrators (**spfracco project**)

Implementation of tools on various platforms:
The DAVAÏ testing tool for new code releases is now fully installed and usable for ACCORD teams on the ECMWF ATOS computer.

Prototyping an environment for a "Meteorological Quality Assurance Infrastructure" (MQA-Infrastructure").

In the beginning of December 2025, a dedicated ACCORD Working Week is planned in the premises of FMI (Helsinki) in order to develop a prototype for the MQA-Infrastructure.

The aim is to set up a prototype for a common infrastructure supporting process oriented verification. Intended capabilities include (this list will be further constructed and confirmed during this summer):

- Use the ECMWF special project **SPFRACCO** for the infrastructure
- Make a catalogue of data and access conditions
- Organize the support for using model-based diagnostic tools such as DDH (domain averaged horizontal diagnostics), MUSC (single-column model)
- Interfaces to Cloudnet and ICOS data; to OSVAS offline surface assimilation tool
- Panelification tool (classification tool of model specific output fields)
- Lagrangean verification/diagnosis based on pattern recognition
- Application of observation operators and data used for data assimilation

The aim of the Physics experts during this WW is to support the MQA prototype development by adding common process-oriented validation cases for different parameterization schemes (Turbulence and Convection, Microphysics, Radiation, CAR, surface-atmosphere continuum).